RCI-2[1] - Utility Demand Side Management

Adopt energy savings standards or targets for utility demand side management programs, expand to include all utilities, and include mechanisms for funding cost-effective programs.

Benefit/Cost of reducing CO_2e:

Arizona:	103 MMt between 2007-2020; 9.2% of 2020 emissions; $-36/ton
New Mexico:	6.5 MMt between 2007-2020; 1.17 % of 2020 emissions; $-23.54/ton
Colorado:	High reduction potential; Low cost
Montana:	6.6 MMt between 2007-2020; 2.57% of 2020 emissions; $-21/ton
Oregon:	4.18 MMt between 2007-2025; 4.3% of 2025 emissions; Cost effective
N. Carolina:	135 MMt between 2007-2020; 7.5% of 2020 emissions; $-24/ton

Assessment: Bin A

The goal of a utility/DSM (Demand Side Management) program is typically to secure additional investment in energy efficiency programs in order to secure cleaner energy at a lower cost. DSM programs can cover a wide range of energy efficiency and conservation efforts. Performance based incentives, efficiency portfolio standards, energy trusts, decoupling of rates and revenues, and appropriate rate treatment for efficiency, are examples of utility/DSM programs.[2] [3]

A DSM may be independently administered by a utility but typically is enacted by state legislation in the form of a Public Benefit Fund (PBF). A small charge – typically equivalent to a $0.27 to $2.50 - is placed a consumer's electricity bill in order to secure funding for investment in energy efficiency programs. Non-profit organizations may also play a role in program administration. Flexibility in the administration of the program is important if the program is to be cost effective and have maximum effect. [4], [5]

Utilities can undertake a similar program by contributing a small amount of their retail to DSM programs within their base of operations.

Energy savings standards or targets include residential indoor lighting,[6] weatherization[7], and optimization of motor efficiency in the industrial sector.[8] The Utah Energy

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[1] From RCI 2, 12, 15, 17, 21, 38, 41, 48, 61, 63, 65
[2] http://www.nmclimatechange.us/ewebeditpro/items/O117F10150.pdf
[3] http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf
[4] See http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf;
[5] http://www.swenergy.org/pubs/Natural_Gas_DSM_Programs_A_National_Survey.pdf;
[6] 12% of electricity use in Utah residential sector according to Utah 2000
[7] Including high efficiency windows and insulation
[8] Particularly in pump systems, fan systems and compressed air systems. Utah 2000 points out that system efficiency could be improved by such things as reducing the overall load on the motor through improved process or system design, improving the match between component size and load requirements, use of speed control instead of throttling or bypass mechanisms, and better maintenance.

Efficiency Strategy includes standards/reduction targets. Goals rather than standards are preferable. Any DSM program should take into account cost effectiveness.

RCI-3[9] - Voluntary efficiency targets w/ recognition program

Benefit/Cost of reducing CO_2e:
New Mexico: 4.6 MMt between 2007-2020; 0.6% of 2020 emissions; N/A $/ton
Colorado: Low reduction potential; Low cost

Assessment: Bin B

Energy savings standards or targets include residential indoor lighting,[10] weatherization[11], and optimization of motor efficiency in the industrial sector.[12] The Utah Energy Efficiency Strategy study includes recommended standards/reduction targets.

This policy option would apply at the State level (as opposed to utility DSM.) An example of such a policy is Governor Huntsman's goal of achieving a 20% increase in energy efficiency by 2015. This option could include additional measures to help realize the Governor's goal such as a recognition program that rewards businesses that meet company-level efficiency milestones.

[9] Includes RCI 2, 12, 38, 63
[10] 12% of electricity use in Utah residential sector according to Utah 2000
[11] Including high efficiency windows and insulation
[12] Particularly in pump systems, fan systems and compressed air systems. Utah 2000 points out that system efficiency could be improved by such things as reducing the overall load on the motor through improved process or system design, improving the match between component size and load requirements, use of speed control instead of throttling or bypass mechanisms, and better maintenance.

RCI-4[13] - Regional Market Transformation Alliance

Benefit/Cost of reducing CO_2e:
New Mexico: 2.9 MMt between 2007-2020; 0.48% of 2020 emissions; $-27/ton
Colorado: High reduction potential; Low cost
Montana: 1.9 MMt between 2007-2020; 0.67% of 2020 emissions; $-23/ton
N. Carolina: 9 MMt between 2007-2020; 0.59% of 2020 emissions reduced; $-32/ton

Assessment: Bin?

The Northwest Energy Efficiency Alliance (NEEA) is one example of a regional market transformation alliance (RMTA). NEEA was created when utilities in the northwest[14] realized that they were duplicating work on energy efficiency outreach programs and efforts, and that other smaller utilities were not able to implement programs at all.[15] A cooperative of utilities recognized that it would be less wasteful - time, energy, dollars - to have a third party develop programs, based on agreed upon need, and allow the utilities to customize the programs for implementation.

NEEA does research and development on programs, delivers framework and platforms for programs, works for code and policy changes, and works directly with manufacturers and retailers to get energy efficient products into the region. They do not implement or run programs.

Having a RMTA makes a lot of sense in the northwest where there are so many small utilities. NEEA is funded by 14 different utilities that represent 30 40 smaller utilities as well. The current budget is $20 million. On the other hand, having an RMTA for Utah alone would be difficult. Rocky Mountain Power has 80% of the market and is able to fund its own programs. A more workable option would be to have one for the Southwest region.[16] This would bring Rocky Mountain Power to the table to discuss how efforts could be better coordinated. It would be necessary to look at service territories, speak to utilities to see if they want to collaborate, and get political leaders to the table. Ultimately, a champion would need to be found to drive this.[17]

If selected, ways to involve rural Utah should be considered.

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[13] Includes RCI 13, 39, 64
[14] Washington, Oregon, Idaho, and Montana
[15] For example, PacifiCorp would create a small builders educational program from the ground up, then another utility would, then another, and others were left wishing and wanting, but unable to fund program development themselves.
[16] Utah, New Mexico, Nevada, Arizona, etc.
[17] Correspondence with Jeff Bumgarner via RCI panelist Lisa Romney, JCI.

RCI-6[18] - Green Power purchasing

Benefit/Cost of reducing CO_2e:
New Mexico: 2.3 MMt between 2007-2020; 0.09% of 2020 emissions; $7/ton
Colorado: Low reduction potential; Medium cost
N. Carolina: 2 MMt between 2007-2020; 0.1% of 2020 emissions; $3/ton

Assessment: Bin B

Green power offers customers the opportunity to buy electricity generated from sources that emit no CO_2. Typical examples include non-emitting nuclear generation, large hydroelectric facilities, and renewable resources such as wind, geothermal, biomass, and small hydro.[19]

Rocky Mountain Power currently offers this option to its customers through its Blue Sky program. Blue Sky is sold in increments; each 100 kwh block represents about 10 percent of the average customer's monthly electricity usage. Payments go directly toward the purchase of wind power from newly developed wind farms, operating within the western U.S. power system.[20] Over 20,000 customers are currently participating.

Programs to promote the purchase of green power could include:

1) Education to increase the level of consumer awareness of green energy benefits and options;
2) Requiring utilities to provide information on fuel sources and their emissions to consumers;
3) The formation of large customer buying groups or aggregation;
4) The verification of the claims regarding a green energy product in order to protect the consumer; and
5) States agencies can purchase green power to meet their own needs thus helping to form the renewable market.

According to EPA, state legislatures have enacted legislation permitting, or even requiring, the provision of green power by utilities or distribution companies. Provided they have authority, public utility commissions can require utilities to offer green power options. The EPA outlines three basic steps to program implementation: 1) Establish a baseline. 2) Convene interested stakeholders to establish goals and attributes for a program. 3) Monitor the success of the green market. A state agency can be established to oversee implementation of a program, ensure consumer protection, and substantiate green power claims. Non-profit organizations can also be enlisted to help, especially in the dissemination of green power information to the general public.[21]

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[18] Includes RCI 30, 52, 75

[19] See http://www.pge.com/about_us/environment/features/clean_energy.html.

[20] http://www.utahpower.net/Article/Article22009.html

[21] http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf

RCI-7[22] - Rate Design

Benefit/Cost of reducing CO_2e:

Arizona: 16 MMt between 2007-2020; 0.9% of 2020 emissions; $-63/ton
New Mexico: 3.6 MMt between 2007-2020; 0.29% of 2020 emissions; $-40/ton
Colorado: Medium reduction potential; Low cost
Montana: 0.2 MMt between 2007-2020; 0.06% of 2020 emissions; $-12/ton
Oregon: 0.16 MMt between 2007-2025; 0.16% of 2025 emissions; Cost effective

Assessment: Bin A

Rate design encourages energy efficiency by such things as inverted block rates that impose higher tariffs on larger users, smart meters, and pursuing peak time surcharge rates to encourage energy efficiency.

Impacts on industrial and large users need to be considered. There is also a concern that the move contradicts cost of services doctrine.

[22] Includes 56, 80

RCI-8[23] - Distributed Generation with Combined Heat and Power Systems (including Reducing Barriers)

Benefit/Cost of reducing CO_2e:
Arizona: 16 MMt between 2007-2020; 1.6% of 2020 emissions; $-25/ton
Colorado: High reduction potential; Low cost
Oregon: 0.54 MMt between 2007-2025; 0.56% of 2025 emissions; Cost effective

Assessment: Bin B

The option has potential, but probably not in the short term. It is difficult to implement where infrastructure is already in place and much easier to do where it is not in place, such as at "greenfield" sites. Access to information and cost of a local system are also considerations.

Because virtually all industries require electricity in addition to thermal energy, combined heat and power (CHP) projects have become popular strategies for reducing energy consumption. CHP refers to the sequential production of thermal and electric energy from a single fuel source.

In the CHP process, heat is recovered that would normally be lost in the production of one form of energy. For example, in the case of an engine configured to produce electricity, heat could be recovered from the engine exhaust and used for processes or water heating, depending in part on the exhaust temperature. The recycling of waste heat differentiates CHP facilities from central station electric facilities. The overall fuel utilization efficiency of CHP plants is typically 70-80 percent versus 35-40 percent for utility power plants. The basic components of any CHP plant include a prime mover, a generator, a waste heat recovery system, and operating control systems. Typically, CHP systems are configured around three basic types of generators: 1) steam turbines; 2) combustion gas turbines; and 3) internal combustion engines.

A representative CHP project for Utah industrial customers would likely consist of a facility rated at less than 12 MW with a capacity factor of approximately 80%. These systems are primarily internal combustion engines or combustion turbines, generally using natural gas of fuel. Such systems reduce energy purchases and may also increase the reliability of electric power deliver. In many cases, industries benefit from sell back tariffs which compel investor-owned or public utilities to purchase excess electricity. Historically, these sell back tariffs have figured prominently in the decision to develop CHP projects[24]

This option includes regulations and/or incentives to CHP.

[23] Includes RCI 53, 76
[24] Utah, 2000

RCI-9[25] - Distributed Generation with Renewable Energy Applications; Net Metering

Benefit/Cost of reducing CO_2e:

Arizona: 10 MMt between 2007-2020; 1.28% of 2020 emissions; $31/ton
Colorado: Medium reduction potential; Medium cost
Oregon: 0.54 MMt between 2007-2025; 0.54% of 2025 emissions; Cost effective
N. Carolina: 29 MMt between 2007-2020; 1.4% of 2020 emissions; $1/ton

Assessment: Bin A

This policy option consists or state and/or utility programs aimed at increasing the installation of distributed renewable energy, such as photovoltaic panels and small wind turbines. This option could include incentive programs and other measures aimed at making distributed renewables more competitive with conventional resources.

Net metering is a strategy for providing electric power generation from renewable sources. It uses a single meter to measure the difference between the total generation and total consumption of electricity by customers with small generating facilities by allowing the meter to turn backward. Net metering can increase the economic value of small renewable energy technologies for customers. It allows the customers to use the utility grid to "bank" their energy: producing electricity at one time and consuming it at another time. This form of energy exchange is particularly ideal for renewable energy technologies. Small-scale electricity generated from renewable energy sources is sold back to the electric utility at retail prices rather than cost.[26]

Utah enacted legislation in 2002 requiring all investor-owned electric and cooperative - but not municipal - utilities to offer net metering to their customers. Eligible generating systems include fuel cells, solar, wind and hydropower systems with a maximum capacity of 25 kilowatts (kW). Total participation in the program is limited to 0.1% of the cumulative generating capacity of each utility's peak demand in 2001.

If a customer generates more electricity than he uses during a billing period, then the utility must credit him for the net excess generation (NEG) at a rate equal to the utility's avoided cost or higher. NEG is carried over to the customer's next monthly bill until the end of each calendar year, at which point any remaining NEG is granted to the utility. A utility may not levy additional charges or fees on net-metered customers, unless it is authorized to do so by the Utah Public Service Commission. Utilities may not require additional liability insurance for systems that meet applicable local and national standards regarding electrical and fire safety, power quality and interconnection requirements.

In February 2007, the Utah Division of Public Utilities published a report on the status of the state's net-metering program.[27] This publication included a discussion of best

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[25] Includes 11, 29, 36, 51, 55, 60, 72, 79, ES-10
[26] Utah, 2000
[27] http://www.psc.state.ut.us/misc/06docs/0699903/NetMeteringReport.pdf

practices adopted by other states, program barriers and recommendations for improvement. Rocky Mountain Power's interconnection agreement and application for net metering service is available online.[28]

Other incentives for the increased implementation of distributed renewable energy systems among consumers are direct subsidies for the purchase of renewable energy systems and tax credits or exemptions given to the buyer of a renewable energy system. A state could also decide to support research and development funding of promising renewable technologies.[29] Utilities in at least 41 states allow customers to produce electricity and sell it back to the grid.

[28] http://www.utahpower.net/Navigation/Navigation552.html

[29] See: http://www.nmclimatechange.us/ewebeditpro/items/O117F10150.pdf

RCI-10[30] - State Appliance Efficiency Standards

Benefit/Cost of reducing CO_2e:

Arizona: 7 MMt between 2007-2020; 0.61% of 2020 emissions; $-66/ton
New Mexico: 2.1 MMt between 2007-2020; 0.29% of 2020 emissions; $-46/ton
Colorado: Medium reduction potential; Low cost
Montana: 1.5 MMt between 2007-2020; 0.44% of 2020 emissions; $-36/ton
Oregon: 0.41 MMt between 2007-2025; 0.42% of 2025 emissions; Cost effective
N. Carolina: 5 MMt between 2007-2020; 0.33% of 2020 emissions; $-62/ton

Assessment: Bin A

This policy option could replicate California standards or develop Utah-specific standards for applicances not covered by federal standards. The feasibility of this option would be driven by local energy costs and principle-driven decisions.

Rocky Mountain Power provides incentives for its residential customers to increase the energy efficiency of their homes through their Home Energy Savings Programs. Rebates are available through this program for ENERGY STAR® qualified clothes washers, dishwashers, refrigerators, water heaters, room air conditioners, compact fluorescent fixtures and windows.[31]

California's Appliance Efficiency Regulations include standards for both federally-regulated appliances and non-federally-regulated appliances. Twenty-one categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in the state. [32]

Arizona law sets minimum energy efficiency standards for the following 12 products not covered by current federal standards: torchiere light fixtures, exit signs, commercial refrigerators and freezers, commercial clothes washers, large commercial air conditioning equipment, icemakers, spray nozzles used in commercial kitchens, low-voltage distribution transformers, metal-halide lamp fixtures, power supplies for electronic devices, unit heaters, and traffic signals. According to the Southwest Energy Efficiency Project (SWEEP), the standards will save Arizona consumers and business a total of $650 million on energy bills by 2030.[33]

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[30] Includes RCI-35
[31] http://www/homeenergysavings.net/utah/home
[32] See http://www.energy.ca.gov/appliances/2006regulations/index.html
[33] See http://www.eere.energy.gov/state_energy_program/news_detail.cfm/news_id=9028

RCI-19[34] - Solar Hot Water and PV Codes for New Buildings

Benefit/Cost of reducing CO_2e:
N/A

Assessment: Bin B

Every new building without this option represents a lost opportunity. Solar hot water heaters have a good pay-back.

New buildings could be configured and wired for solar hot water heaters and PV panels. In addition, buildings with heavy use of heated water could be required to install solar water heaters.

Tucson implemented the 2000 version of the International Energy Conservation Code (IECC 2000) in July of 2003, and a number of other smaller jurisdictions have adopted this or a similar up-to-date code.[35]

In California, to encourage affordable housing developers to include PV in their developments, the California Energy Council will accommodate builder needs by providing a 25% higher rebate, not to exceed 75% of the total system cost, if affordable housing applicants meet several specific criteria. Eligible projects include single- and multi-family developments where at least 20% of the project units are reserved for very low-, lower-, or moderate-income households for a period of at least 45 years. The PV systems in multi-family projects must serve only the project units reserved for extremely low, very low, lower, or moderate income households and the manager's unit. The PV systems may serve common areas in a multi-family project only where all of the project's units are reserved for extremely low, very low, lower or moderate income households.[36]

[34] Includes ES-11, ES-12
[35] See http://www.swenergy.org/ieenb/codes_report.pdf
[36] See http://www.gosolarcalifornia.ca.gov/nshp/affordable.html

RCI-28[37] - Energy Management Training / Training of Building Operators

Benefit/Cost of reducing CO_2e:
Colorado: High reduction potential; Low cost

Assessment: Bin C

Building Operator Certification (BOC) is a professional development program in the energy efficient operation of building systems to qualify facilities professionals for certification. BOC is a growing national program, now in 16 states including Washington, Oregon, California, Illinois, Ohio, New York, New Jersey, and Massachusetts.

In California, BOC is offered at two levels. The first typically is $1,095 per participant, and $795 for a second registrant or more from the same company. The registration fee includes 56 hours of classroom instruction, seven course handbooks, facility project assignments, and certification recognition materials. BOC Level two is billed at the same rate and involves 49 hours of classroom instruction, six course handbooks, facility project assignments, and certification recognition materials. There are also free seminars available through public utilities, which include both classroom style and web-based training style instruction.

A free Savings By Design program provides design assistance to commercial, industrial, agricultural building owners to promote energy efficient design and construction practices also provided by local utilities. Major employers across the country are sending operators to BOC training for certification.[38]

This option also includes benchmarking and tracking. An energy profile evaluates a property's potential for energy savings. This information also helps determine baseline energy performance and can be used to benchmark a building's performance against comparable properties.

An energy accounting system records information from the energy profile over time. An energy accounting system is generally kept in a simple spreadsheet or tracked through computer software. Buildings equipped with an energy management system may be able to use this to automatically generate real-time information for an energy accounting system. Once ECMs or EEMs have been installed, this historical record enables energy mangers to later measure program results against baseline performance. It can also indicate when problems arise, such as through abnormally high energy costs related to equipment failure.

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[37] Includes 49, 50, 70, 71

[38] See http://www.theboc.info/ca/fees_ca.html Also: http://www.fypower.org/inst/gov.html; http://www.fypower.org/inst/tools/rgl_results.html?z=92507&s=inst&c=Education; http://www.fypower.org/inst/tools/rgl_results.html?z=92507&s=inst&c=Project%20Design%20Assistance

Added components of an energy accounting system may include monthly or more frequent energy-use and cost reports, changes in occupancy or facility usage, utility rate schedules, and performance tracking of major equipment systems.[39]

The Online Commercial Energy Profile Analysis Program through local California utilities provides an online tool to analyze company's energy use and provide customized recommendations for reducing energy consumption and costs to large customers free of charge. Depending upon the utility service area, small and medium customers can choose from an online, phone, mail-in, CD-ROM or on-site audit, while large customers can request a technical consultant to conduct more targeted evaluations and generate customized energy-saving recommendations. There is also a Free Commercial Energy Systems Library, which contains thousands of pages of information in a format designed to make the information interesting and easily accessible. It is also possible to borrow state-of-the-art monitoring equipment inexpensively for up to 30 days from local California utilities.[40]

[39] See: Fire Your Power: Commercial Office Buildings, Available at http://www.fypower.org/bpg/module.html?b=offices&m=Planning_an_Energy_Program&s=Energy_Profiles

[40] http://www.fypower.org/inst/tools/rgl_results.html?z=92507&s=inst&c=Audits
http://www.fypower.org/inst/tools/rgl_results.html?z=92507&s=inst&c=Diagnostic%20%26%20Measurement%20Tools

RCI-31[41] - Government Lead by Example w/ Mandatory Efficiency Targets

Benefit/Cost of reducing CO_2e:

Arizona: 3 MMt between 2007-2020; 0.24% of 2020 emissions; $-4/ton
New Mexico: 0.9 MMt between 2007-2020; .19% of 2020 emissions; $-20/ton
Colorado: Low reduction potential; Low cost
Montana: 1.7 MMt between 2007-2020; 0.6% of 2020 emissions; $-5/ton
Oregon: 0.117 MMt between 2007-2025; 0.12% of 2025 emissions
N. Carolina: 7 MMt between 2007-2020; 0.4% of 2020 emissions; $-14/ton

Assessment: Bin A

Governor Huntsman has called for a 20 percent increase in energy efficiency in Utah by 2015.

On March 17, 2006, House Bill 80 was enacted, amending and updating state energy efficiency policy. Under this bill, the Division of Facilities Construction and Management is required to administer the State Building Energy Efficiency Program. The Division is responsible for developing guidelines and procedures for energy efficiency in state facilities, and assisting state agencies, commissions, divisions, boards, departments, and institutions of higher education in implementing these procedures into their facilities.

Additionally, the Division is charged with developing incentives that promote energy conservation and the reduction of energy costs in state buildings, procuring energy efficient products when practicable, analyzing state agencies' energy consumption, establishing an advisory group to assist with the development and implementation of the State Building Energy Efficiency program, and providing a yearly energy savings report, including long-term strategies and goals, to both the governor and the legislature.

The State Building Board is required to work in conjunction with the Division to establish design criteria, standards, and procedures for the planning, design, and construction of new state buildings and improvements to existing state facilities. Among other outcomes of a proposed building project, life-cycle costing of the most prudent cost of owning and operating the facility, in addition to other analyses, must address the expected energy efficiency of a given facility.

Each state entity must develop a program to manage energy efficiency and cost conservation and to appoint a staff member to coordinate the energy efficiency program. Agencies may enter into an energy savings agreement for a term of up to 20 years.[42]

This option could also include shared savings and procurement programs.

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[41] Includes CC5, Includes RCI-58

[42] http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=UT09R&state=UT&CurrentPageID=1&RE=1&EE=1

RCI-36[43] - State Promotion and Tax or Other Incentives for Efficient Products (e.g. EnergyStar)

Benefit/Cost of reducing CO_2e:
Colorado: Medium reduction potential; Low cost
Oregon: Cost effective

Assessment: Bin A

This program could be modeled on the current Renewable Energy Tax Credit program. State tax or other incentives could be provided for the purchase of energy efficient products such as appliances. There are also federal energy efficiency incentives that could serve as an example for the development of such a policy option.

Because energy efficiency measures often pay for themselves over time, this type of program may require lower levels of support than are typically needed for renewable energy or clean vehicle incentive programs.

[43] Includes RCI-11

RCI-47[44] - Increased use of blended cement

Benefit/Cost of reducing CO_2e:
Colorado: Medium reduction potential; Low cost

Assessment: Bin: D – Not enough information is known at this time to evaluate this policy option.

According to the Utah 2000 report:

"Cement production is among the largest sources of non-fossil emissions in the Utah. Specifically, CO_2 results from the heating of limestone, which constitutes approximately 80 percent of the feed to cement kilns. During cement production, high temperatures are employed to transform the limestone into lime, releasing CO_2 to the atmosphere."

The cement production process entails numerous stages;hence, there are several areas for efficiency improvements. On a weighted average basis, it is estimated that the introduction of modern technologies at critical stages could result in a gain of 28 percent energy efficiency. With forecasted emissions placed at 596,050 in 2010, this level of savings translates into 165,214 tons."

[44] Includes 78
[49] Utah 2000.

RCI-54[45] - Fuel Switching to Less Carbon-Intensive Fuels

Benefit/Cost of reducing CO_2e:
Colorado: Medium reduction potential; Medium cost
Oregon: 0.1 MMt between 2007-2025; 0.1% of 2025 emissions; Cost effective

Assessment: Bin D

Industrial sector action.

45

RCI-57[46] - Reinvestment Fund

Benefit/Cost of reducing CO_2e:
Colorado: Medium reduction potential; Low cost

Assessment: Bin B

Establishment of a revolving loan program for public sector buildings.

46

RCI-66 - Focus on Small and Medium Enterprises (SMEs)

Benefit/Cost of reducing CO_2e:
Colorado: Low reduction potential; Low cost

Assessment: Bin D

The Industrial Assessment Center (IAC) at Arizona State University provides free energy, waste and productivity analysis studies to qualified Arizona and Nevada Manufacturers, recommending methods to conserve resources, and reduce operating costs. Funding comes from the US Department of Energy. On average, implemented recommendations from assessments performed by the IAC at ASU saved each customer about $65,000 per year.[47]

In Arizona's Energy Advisor program, small to medium-sized businesses (those under 20,000 square feet) whose peak summer demand is less than 100 kilowatts can receive on on-site energy audit and computer analysis of cost-effective energy efficiency measure for $150 through SRP's Energy Advisor program.[48]

[47] See http://www.eas.asu.edu/~iac/index.html
[48] See http://www.swenergy.org/programs/arizona/utility.htm

RCI-81 - Participation in Voluntary Industry-Government Partnerships

Benefit/Cost of reducing CO_2e:
Colorado: Low reduction potential; Low cost

Assessment: Bin B

Examples:

The Natural Gas STAR Program is a flexible, voluntary partnership between EPA and the oil and natural gas industry. Through the Program, EPA works with companies that produce, process, and transmit and distribute natural gas to identify and promote the implementation of cost-effective technologies and practices to reduce emissions of methane, a potent greenhouse gas. There is no upfront cost to joining the Natural Gas STAR Program and members have found significant economic benefits from participation. Some of the Best Management Practices (BMPs) have small incremental costs over standard technologies or processes, they are generally cost effective, and can be recouped in as little as 1-2 years.[49]

The SF6 Emission Reduction Partnership for Electric Power Systems is a collaborative effort between EPA and the electric power industry to identify and implement cost-effective solutions to reduce sulfur hexafluoride (SF6) emissions. SF6 is a highly potent greenhouse gas used in the industry for insulation and current interruption in electric transmission and distribution equipment. Currently over 70 utilities participate in this voluntary program. [50]

[49] See http://www.epa.gov/gasstar/
[50] http://www.epa.gov/electricpower-sf6/index.html

RCI-82[51] - Process Changes/ Optimization

Benefit/Cost of reducing CO_2e:
Colorado: Medium reduction potential; Unknown cost
Montana: 3.6 MMt between 2007-2020; 1.25 % of 2020 emissions; $-25/ton

Assessment: Bin D

This could include productive use of waste heat. This is a good idea, but unclear how to implement.

[51] Includes AF-44

RCI-a[52] - Water Pumping, Treatment, and Use Efficiency

Benefit/Cost of reducing CO_2e:
Arizona: 6 MMt between 2007-2020; 0.48% of 2020 emissions

Assessment: Bin B

At the residential level, water pumping and treatment efficiency is typically confined to improvements homeowners can make.

Programs for treatment efficiency are tailored to specific industry types. Examples of previously implemented strategies can be found for electronics, semi-conductor, cleanroom, fume hood, pulp & paper, stone, glass & clay products, and food products industries.[53]

The Agricultural Pumping Efficiency Program (APEP) is a multi-level program addressing the resource management problems in California. Eligibility extends to all owners or users of a non-residential, PG&E electric or natural gas account that is primarily used for pumping water for the following: Production agriculture; landscape or turf irrigation; municipal purposes, including potable and tertiary-treated (reclaimed) water but excluding pumps used for industrial processes, raw sewage, or secondary-treated sewage.

Its goals are:

1. Get highly efficient hardware in the field, including pumping plants, irrigation systems, and water distribution systems.
2. Ensure that this hardware is managed correctly.

APEP has operated with funding from a variety of sources including the California Energy Commission, the California Public Utilities Commission, and the Federal Environmental Protection Agency. It works with agriculturalists and municipal and private water companies. [54]

[52] Includes RCI 34, 59, 85
[53] http://www.energy.ca.gov/process/industry/industry_intro.html
[54] http://www.pumpefficiency.org

RCI-b[55] - Incentives for Improved Design and Construction (e.g. Energy Star, LEED, green buildings, expedited permitting)

Benefit/Cost of reducing CO_2e:
Arizona: 18 MMt between 2007-2020; 1.8% of 2020 emissions; $-17/ton
New Mexico: 7.4 MMt between 2007-2020; 1.2% of 2020 emissions; $-2/ton
Colorado: Medium reduction potential; Low cost
N. Carolina: 10 MMt between 2007-2020; 0.5% of 2020 emissions; $-14/ton

Assessment: Bin A

These types of programs are implementable. They require education and communication. The impacts are likely to be market-driven. To fund the incentives, the program could also involve a tax or fee shift. Some of these programs may overlap with DSM efforts and need to clarified..

Utah currently has a Utah Energy Star program. **Energy Star®** labeled homes incorporate energy savings in design and construction and use 15% less energy. [56] Rocky Mountain Power offers cash incentives to contractors who build energy-efficient homes.[57] Energy efficient mortgages are available to purchase these homes and to remodel existing homes. [58]

Rocky Mountain Power's Energy FinAnswer provides cash incentives to help commercial and industrial customers improve their heating, cooling, refrigeration, compressed air, lighting, or industrial process. New construction and retrofit projects for all industrial facilities can participate as well as new commercial projects and retrofits in facilities larger than 20,000 square feet.[59]

Arizona homeowners are allowed an income tax deduction of 5% of the sales price (up to $5,000) if the residence is certified to be 50% more energy efficient than the 1995 Model Energy Code. The average tax savings is $190. The credit is available for new homes built before December 2010.[60]

Arizona Public Service's Performance Built Homes program provides marketing and financial assistance to builders that guarantee a home's annual heating and cooling bills will not exceed a certain maximum level. All homes must first exceed the minimum requirements for the EPA Energy Star Home program. Then, for those builder's guaranteeing heating and cooling bills under a product manufacturer's program[61], APS will pay 50% of the builder's inspection costs (which can range from $50 to $250

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[55] Includes 11, 18, 26, 43, 44, 67
[56] http://www.energystar.gov
[57] http://www.ecosconsulting.com/rockymtnpower/builders/builderincentives.html
[58] http://www.utahenergystar.org/financial_bnefits.html
[59] http://www.rockymtnpower.net/Navigation/Navigation71490.html
[60] See Alliance to Save Energy. http://www.ase.org/content/article/detail/2607
[61] Including Certified Plus, Engineered for Life, or Environments for Living programs

depending on the program requirements) associated with the obtaining the manufacturer's guarantee. Fifteen production and custom homebuilders in the metropolitan Phoenix area offer the guarantee. The incremental costs to build homes that just meet code versus base-case homes vary by location from $1,500 to $3,700.[62]

The California Energy Commission has a 10-year, $350 million program to encourage solar in new home construction.[63] California Solar Initiative offers cash incentives on solar systems of up to $2.50 a watt, which combined with federal tax incentives, can cover up to 50 percent of the total cost of a solar system[64]

California offers integrated energy design incentives to reward exceptional design accomplishments through its Savings By Design program, which offers special design assistance as well as financial incentives to design teams. The design team qualifies for incentives when the building design saves at least 15%. Incentives range from $.03 - .06/annualized kWh savings and $.15 - .27/annualized therm savings as the design becomes more efficient. The maximum incentive per project is $50,000.[65]

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings.[66]

Planting a tree in the right place[67], installing cool or vegetative roofs, and switching to cool paving material all have an energy-saving benefit.[68] There are some limited provisions for landscaping through utilities and other municipal resources which provide rebates for planting selected shade trees in certain locations around homes. [69]

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[62] See http://www.swenergy.org/programs/arizona/utility.htm The incremental cost to build ENERGY STAR + homes versus base-case homes varies from $7,000 to $8,500. In spite of somewhat higher initial costs, lifetime (30-year) savings of ENERGY STAR + homes versus base homes average is $17,000 under the conservative assumption that energy costs will track inflation. If energy prices outstrip inflation, conservation investments will yield even better returns

[63] See http://www.gosolarcalifornia.ca.gov/csi/index.html.

[64] See: http://www.cpuc.ca.gov/static/energy/solar/_index.htm

[65] http://www.savingsbydesign.com/teamincen.htm

[66] http://www.usgbc.org

[67] http://extension.usu.edu/forestry/HomeTown/Energy_TreesandEnergy.htm

[68] http://www.epa.gov/hiri/strategies/index.html

[69] http://www.washingtonpost.com/wp-dyn/content/article/2006/09/03/AR2006090300926_pf.html

RCI-e[70] - Improved Building Codes to Reduce Life-Cycle Energy Consumption

Benefit/Cost of reducing CO_2e:

Arizona: 14 MMt between 2007-2020; 1.3% of 2020 emissions; $-18/ton
New Mexico: 16.6 MMt between 2007-2020; 2.3% of 2020 emissions; $-12/ton
Colorado: High reduction potential; Low cost
Montana: 1.6 MMt between 2007-2020; 0.67% of 2020 emissions; $-9/ton
Oregon: 0.61 MMt between 2007-2025; 0.66% of 2025 emissions; Cost effective
N. Carolina: 29 MMt between 2007-2020; 1.6% of 2020 emissions; $-17/ton

Assessment: Bin A

Building codes set the minimum standards to which homes and other buildings must be constructed. Improved building codes could raise the standard and increase energy efficiency. In addition to setting new standards, training for contractors and others and enforcement of standards would need to be factored in.

EnergyStar®Homes is a program that works with home builders to provide homes that are at 30 percent more efficient than homes built to meet the minimum requirement of the Model Energy Code. The Energy Star® Homes program rates three major areas: heating, cooling, and water heating. The Energy Star® Homes program certifies that the home exceeds the Model Energy Code by at least 30 percent. This label may act as an additional incentive when purchasing the home and may lead to preferred mortgage finances from lending institutions since the label serves as a verification of lower than average energy bills. Exceeding the Model Energy Code by 30 percent will also cut heating and air conditioning costs in proportion to a decline in energy use. It is estimated that the average Energy Star® Home costs somewhere within the range of $200 to $500 more than home that only meets the minimum standards of the Model Energy Code. The EPA estimates that over the life of a 30-year mortgage, a Energy Star® Home owner may save more than $50,000 through reduced monthly utility bills.[71]

New Mexico is considering requiring buildings to cut energy use by 50%.sq ft by 2010. Improved building codes require new buildings to meet minimum energy efficiency requirements and could also be applied to existing buildings undergoing renovations. Codes usually address improvements in "thermal resistance" in the exterior and windows, air leakage, and heating and cooling efficiencies.[72]

The AZ Climate Change Advisory Group recommended that Arizona adopt a statewide code or strongly encourage municipalities to adopt and maintain improved building codes. The CCAG also recommends that Arizona or the municipalities adopt the 2004 International Energy Conservation Code (IECC), and consider adopting innovative features of California's latest Title 24 building energy codes, such as lighting efficiency requirements in new homes. In addition, the CCAG recommends that Arizona and local

[70] Includes 22, 23, 24, 25, 45, 46, 69
[71] Utah 2000 – Need to verify if this information is still correct
[72] See http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf

jurisdictions should update energy codes regularly, such as a three-year cycle of review based on the national model codes release.[73]

Arizona is a "home-rule state" meaning that the municipalities are able to adopt and enforce their residential and commercial building energy codes. According to the Southwest Energy Efficiency Project (SWEEP), Arizona passed legislation encouraging local governments to voluntarily adopt of the 2000 International Energy Code (IECC) and ASHRAE Standard 90.1-1999. State government buildings must comply with ASHRAE Standard 90.1-1999, the most recent and model standard for energy efficiency in commercial buildings.[74]

In California, Energy Efficiency Standards for Residential and Nonresidential Buildings were established in 1978 in response to a legislative mandate to reduce energy consumption. California Title 24 is updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Currently in the process of being updated, the first phase of the development process will include a series of public workshops, while the second phase will present draft language for the 2008 Standards based on the discussions in the first phase and will offer opportunities for further public input. The third phase will be the formal rulemaking for which final proposed language for the 2008 Standards. California's building efficiency standards (along with those for energy efficient appliances) have saved more than $56 billion in electricity and natural gas costs since 1978. It is estimated the standards will save an additional $23 billion by 2013.[75]

[73] See http://www.azclimatechange.us/ewebeditpro/items/O40F9347.pdf
[74] See Southwest Energy Efficiency Project (SWEEP)http://www.swenergy.org/
[75] http://www.energy.ca.gov/title24/index.html

RCI-g[76] - Alternative Gases/Leak Reduction

Benefit/Cost of reducing CO_2e:
N/A

Assessment: Bin D

More information is needed. This option includes the industrial sector.

The Utah GHG Inventory may identify sources of other greenhouse gases that would be reduced through these types of efforts.

[76] Includes 40, 83, 84

RCI-i - Waste/Recycling

Benefit/Cost of reducing CO_2e:
Arizona: 36 MMt between 2007-2020; 2.25% of 2020 emissions
New Mexico: 8.4 MMt between 2007-2020; 1% of 2020 emissions
Oregon: 6.61 MMt between 2007-2025; 6.8% of 2025 emissions

Assessment: Bin A

Coordinate w/ cross-cutting